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BOEING REALTY CORPORATION
FORMER C-6 FACILITY
LOS ANGELES, CALIFORNIA

TECHNICAL MEMORANDUM
QUARTERLY REPORT NO. 21
FIRST QUARTER 2007
FULL-SCALE SVE SYSTEM

To: **Mr. Robert Scott**
Boeing Realty Corporation
4501 Conant, Building 1
Long Beach, CA 90808

From: **Haley & Aldrich, Inc.**

Date: **26 April 2007**

Subject: **Quarterly Report No. 21, First Quarter 2007 Full-Scale SVE System, Boeing Realty Corporation, Former C-6 Facility – Parcel A, Los Angeles, California**

Haley & Aldrich, Inc. (Haley & Aldrich) has prepared this technical memorandum to summarize full-scale soil vapor extraction (SVE) activities conducted at the former Boeing Realty Corporation (BRC), C-6 Facility, Building 1/36 area (Site) located at the northwest corner of Normandie Avenue and Knox Street in the City of Los Angeles, California. The location of the Site is shown on Figure 1.

This technical memorandum presents the Site background followed by a discussion of SVE operations and has been prepared in response to Regional Water Quality Control Board, Los Angeles Region (LARWQCB) reporting requirements.

BACKGROUND

Laboratory results for soil samples collected at the Site indicated the presence of volatile organic compounds (VOCs) at depth, requiring remediation to prevent possible impact to groundwater. SVE was recommended for the remediation of deep impacted soil (soil deeper than 12 feet below ground surface). Haley & Aldrich was contracted by BRC to install and operate first an SVE pilot test system, and later a full-scale SVE system.

Workplans for the SVE systems were submitted and approved by the LARWQCB in June 2001, and December 2001, respectively. The full scale SVE system at the Site was operated from May 2002 to September 2004 when the system was shut down to accommodate Site redevelopment. The full scale SVE system was re-mobilized to the Site and restarted on 2 March 2006.

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Letter of Transmittal

Date	26 April 2007
File Number	28776-227
From	Patrick Keddington

To	Boeing Realty Corporation 4501 Conant, Building 1 Long Beach, CA 90808
Attention	Mario Stavale
CC	
Subject	Boeing Realty Corporation, SVE Quarterly Report for the Former C-6 Site

Copies	Date	Description
1	26 April 2007	Quarterly Report No. 21 First Quarter 2007 Full-Scale SVE System Boeing Realty Corporation Former C-6 Facility - Parcel A Los Angeles, California

Transmitted via ☐ First class mail ☒ Overnight express ☐ Hand delivery ☐ Other

Remarks

Included is one copy of the above referenced report for your files. One copy was submitted on your behalf to Mrs. Ana Townsend of the Los Angeles Regional Water Quality Control Board.

SVE System Description and History

SVE pilot testing at the Site was conducted between July and October 2001, when the pilot SVE system was shut down and the SVE wells were abandoned to accommodate Site grading. The pilot SVE system was re-installed and re-started in December 2001 and operated through March 2002.

Full scale SVE treatment of deep soils at the Site was started in May 2002. The full-scale SVE system consisted of 53 well screens (17 dual- and 9 single-screened SVE wells), a trailer-mounted 1,000 standard cubic feet per minute (scfm) blower system, three 8,000-lb granular activated carbon (GAC) vapor control vessels (primary, secondary, and stand-by), and associated piping.

In June 2002, unexpected exothermic carbon reactions with 2-Butanone (MEK) required that the SVE system be shut down for repairs and modifications. The system was restarted on 11 March 2003. After system modifications, the system was optimized to remove mass and follow a seven-day carbon change-out frequency. Three, single-screened SVE wells were installed in June 2004. Full scale SVE treatment of deep soils at the Site continued through September 2004, when the system was shut down to facilitate Site redevelopment.

Prior to Site redevelopment, the SVE wells were cut, capped, surveyed, and buried at least 3 feet below ground surface (bgs) to protect them from site redevelopment activities. The SVE mechanical equipment, including carbon vessels, was removed and stored at an off-Site location. Between February 2005 and March 2006, during Site redevelopment, the SVE wells were uncovered and connected, via subsurface piping, to the remediation compound located at the northeast corner of the Site (Figure 2) and the SVE mechanical equipment was re-mobilized to the Site. Full scale SVE operations resumed on 2 March 2006.

Operational Summary, First Quarter 2007

Operations for the First Quarter 2007 covered the period of 1 January 2007 through 31 March 2007. The total mass of VOCs reported removed during SVE operations during the first quarter 2007 was approximately 102 pounds. Operational data for the full-scale SVE system is presented in Table 1.

Total hours of operation for this quarter were approximately 2,054. Down time occurred due to high water alarms, high temperature alarms and water disposal. GAC change outs were not performed during this quarter. Percent up time based on all hours in the first quarter (2,160 hours; January 1 through 31 March 2006) is 95 percent and is presented on Graph 1. The system was operated in compliance with South Coast Air Quality Management District (SCAQMD) permit requirements during this quarter.

A system maintenance activity log is provided in Table 2 and a summary of additional operational data is presented below:

Days of Operation	86 (2,054 hours)
Available Days of Operation	90 (2,160 hours)
Operational Time (%)	95%
Estimated Mass Removed during Period	102 pounds of VOCs reported as total non-methane hydrocarbons.
Cumulative Mass Removed (July 2001-March 2007):	33,478 pounds of VOCs

OPERATIONS INFORMATION, FIRST QUARTER 2007

Key events that occurred during the quarter include:

- 20 February 2007 Closed wells VEW-05, -06-10A.
- 9 and 11 March 2007 System shut down due to high temperature.

Well vapor concentrations of VOCs measured at the end of the First Quarter 2007 are plotted on Figure 3. The well vapor concentration contours depicted on Figures 4A and 4B illustrate baseline start-up concentrations as well as remediation progress through 31 March 2007.

Well field MEK concentration contours, from December 2002 through April 2006 are depicted on Figure 5. Samples were not collected during the first quarter 2007 to measure wellhead MEK concentrations.

The cumulative mass removed by the full-scale SVE system is shown in Graph 2. Total VOC concentrations reported in grab samples collected from the undiluted influent of the SVE system during start-up and at the end of the quarter are plotted on Graph 3. Exothermic reactions were not observed in the GAC beds during the first quarter of 2007.

FIELD MEASUREMENTS, FIRST QUARTER 2007

In accordance with the SCAQMD permit requirements, flow rate and VOC concentration measurements were collected at the undiluted inlet, diluted inlet, between the GAC vessels, and at the exhaust stack. Flowrates were measured with a direct flow meter or by a hand-held Veloci-calc meter™. Additional measurements collected during operation included vacuum readings at each extraction well, total inlet, and at the GAC vessels and the blower exhaust temperature. The combined system influent VOC measurements are presented in Table 1. Field measurements of flow, VOC concentration, vacuum, and temperature were also collected at each well during the quarter. These measurements are provided in Table 3.

Individual SVE well flow rates this period ranged from approximately 4 to 146 scfm for a total flow rate from the well field of 660 to 716 scfm. The system operated with inlet vacuums ranging from 54 to 61 inches of water.

VAPOR SAMPLING AND ANALYSIS, FIRST QUARTER 2007

For this period, nine vapor samples were collected from the process air stream (three from the undiluted inlet to primary GAC vessel, three from the effluent of the primary GAC vessel, and three from the exhaust from the secondary GAC vessel) and delivered to a state-certified laboratory for analysis. These samples were collected for SCAQMD permit compliance as well as system performance evaluation. The vapor samples were collected in Summa™ canisters provided by the analytical laboratory. Laboratory analyses were conducted on vapor grab samples using EPA Method 21/TO-14A. The laboratory results of the vapor samples from the system are summarized for detected compounds in Table 4.

Based on the results of the laboratory analysis of vapor grab samples, maximum undiluted inlet VOC concentrations of speciated compounds in parts per billion by volume (ppbv) for the period are as follows:

■ Total Petroleum Hydrocarbons as gasoline	16,000 ppbv
■ 2-Butanone (MEK)	15,000 ppbv
■ Toluene	5,600 ppbv
■ 1,1,1-Trichloroethane (1,1,1-TCA)	1,200 ppbv
■ 4-Methyl-2-pentanone (MIBK)	850 ppbv
■ Trichloroethene (TCE)	640 ppbv
■ Acetone	520 ppbv
■ Xylenes (total)	470 ppbv
■ m-Xylene & p-Xylene	360 ppbv
■ 1,1-Dichloroethene (1,1-DCE)	170 ppbv
■ o-Xylenes	110 ppbv
■ Ethylbenzen	52J ppbv
■ Tetrachloroethene (PCE)	33 ppbv
■ 1,1-Dichloroethane (1,1-DCA)	9.2 ppbv
■ Chloroform	8.5J ppbv
■ 1,1,2-Trichloroethane (1,1,2-TCA)	7.0J ppbv
■ cis-1,2-Dichloroethene (cis 1,2-DCE)	6.3 ppbv
■ Trichlorofluoromethane	4.1J ppbv
■ 1,2- Dichloroethane	2.0J ppbv
■ Dichlorodifluoromethane	1.1J ppbv
■ trans-1,1-Dichloroethene (trans 1,1-DCE)	1.0J ppbv

J = Estimated value. Analyte detected above method detection limit, but below method reporting limit.

2-Butanone (MEK) was the VOC detected at the highest concentration during the first quarter of 2007. Based on laboratory analytical data collected this quarter, the mass of VOCs, measured as total non-methane hydrocarbons was approximately 102 pounds, as shown on Graph 2. The average mass removal rates for this quarter are estimated to be approximately 1.2 lbs/day, based on mass removed and actual days operated.

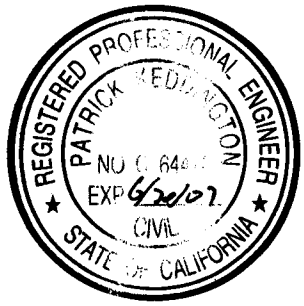
ACTIVITIES FOR SECOND QUARTER 2007

Based on VOC concentration measurements and mass removal rates observed this quarter, SVE operations will continue during the Second Quarter 2007. This will include:

- Weekly monitoring of system parameters and well field VOC concentrations;
- Well field optimization to maximize mass removal while maintaining maximum system flow, extracting from as many wells as possible, and balance GAC usage rates; and
- Weekly sampling to assure compliance with SCAQMD permit conditions.

We appreciate the opportunity to provide environmental consulting services on this project. Please do not hesitate to call if you have any questions or comments.

Sincerely yours,
HALEY & ALDRICH, INC.



Patrick A. Keddington, PE
Senior Engineer

Richard M. Farson, P.E.
Vice President

c: John Scott, Boeing
File

Attachments:

Table 1 – Treatment System Field Data
Table 2 – Maintenance Log
Table 3 – Wellhead Field Data
Table 4 – Influent Vapor Concentrations
Figure 1 – Site Location Map
Figure 2 – SVE Treatment System Location
Figure 3 – Building 1/36 Wellhead VOC Concentration Contour (March 2007)
Figure 4A – Building 1/36 Wellhead VOC concentration Contours (April 2003 thorough March 2006)
Figure 4B – Building 1/36 Wellhead VOC concentration Contours (June 2006 thorough March 2007)
Figure 5A – Building 1/36 Wellhead MEK Concentration Contours (March 2003 and February 2004)
Figure 5B – Building 1/36 Wellhead MEK Concentration Contours (September 2004 and April 2006)
Graph 1 – Monthly Percent Operation
Graph 2 – Cumulative VOC Mass Removed
Graph 3 – SVE System Total Undiluted Influent Concentration

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